

Serial No. 10/058,022

RUNGE et al.

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A P P E N D I X I:

CLAIM AMENDMENTS:

Enter new Claim 21 as indicated in the following listing of the claims:

1. (previously presented) A method of improving the apparent density and stability of a dry powder of one or more carotenoids which comprises
 - a) dispersing the one or more carotenoids in an aqueous molecular or colloidal solution of a mixture comprising effective amounts of lactose and a protective colloid, and optionally containing additional solvents, and
 - b) converting the dispersion formed in step a) into a dry powder by removing the water and the additional solvents and drying, optionally in the presence of a coating material,wherein at least one soybean protein is used as protective colloid in process step a).
2. (previously presented) The method of claim 1, wherein the dispersing step a) comprises preparing a suspension of the one or more carotenoids in the aqueous molecular or colloidal solution of the mixture of lactose and the at least one soybean protein.
3. (previously presented) The method of claim 2, wherein the suspension prepared in step a) is ground before being converted into the dry powder in step b).
4. (previously presented) The method of claim 1, wherein the dispersing step a) comprises the following steps:
 - a₁) dissolving the one or more carotenoids in a water-miscible organic solvent or in a mixture of water and a water-miscible organic solvent or
 - a₂) dissolving the one or more carotenoids in a water-immiscible organic solvent and
 - a₃) mixing the solution obtained in a₁) or a₂) with the aqueous molecular or colloidal solution of the mixture of lactose and the at least one soybean protein, to obtain a hydrophobic phase of the carotenoid in nanodispersed form.

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5. (previously presented) The method of claim 1, wherein at least one partially degraded soybean protein with a degree of hydrolysis of from 0.1 to 20% is used as protective colloid.
6. (previously presented) The method of claim 1, wherein the carotenoids used are oxygen-containing carotenoids.
7. (previously presented) The method of claim 6, wherein the oxygen-containing carotenoids are compounds selected from the group consisting of astaxanthin, canthaxanthin, lutein, zeaxanthin, citranaxanthin and ethyl β -apo-8'-carotenoate.
8. (previously presented) The method of claim 7, wherein
 - a) astaxanthin and/or canthaxanthin is dissolved in a water-miscible organic solvent or a mixture of water and a water-miscible organic solvent at temperatures above 30°C,
 - b) the resulting solution is mixed with an aqueous molecular or colloidal solution of a mixture of lactose and a partially degraded soybean protein with a degree of hydrolysis of from 0.1 to 20%, and
 - c) the dispersion which has formed is converted into a dry powder.
9. (previously presented) The method of claim 8, wherein astaxanthin is used as carotenoid.
10. (previously presented) A carotenoid-containing dry powder having an improved apparent density and stability which is obtained by the method of claim 1.
11. (previously presented) A dry powder as claimed in claim 10 with a carotenoid content of from 0.1 to 30% by weight.
12. (previously presented) A dry powder as claimed in claim 10, comprising oxygen-containing carotenoids selected from the group consisting of astaxanthin, canthaxanthin, lutein, zeaxanthin, citranaxanthin and ethyl β -apo-8'-carotenoate.
13. (previously presented) A dry powder as claimed in claim 12, comprising 5 to 20% by weight of astaxanthin.
14. (previously presented) A dry powder as claimed in claim 12, comprising 5 to 20% by weight of canthaxanthin.

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15. (previously presented) A human food, a pharmaceutical or an animal feed comprising the carotenoid-containing dry powder defined in claim 10 as an additive.
16. (previously presented) A carotenoid-containing dry powder having an improved apparent density and stability which is obtained by a process comprising
- a) dispersing one or more carotenoids in an aqueous molecular or colloidal solution of a mixture comprising effective amounts of lactose and a protective colloid, and optionally containing additional solvents, and
 - b) converting the dispersion formed in step a) into a dry powder by removing the water and the additional solvents and drying, optionally in the presence of a coating material,
- wherein at least one partially degraded soybean protein having a degree of hydrolysis of from 0.1 to 20% is used as the protective colloid in process step a).
17. (previously presented) The dry powder defined in claim 16 wherein stage a) of the process comprises
- a₁) dissolving the one or more carotenoids in a water-miscible organic solvent or in a mixture of water and a water-miscible organic solvent, or
 - a₂) dissolving the one or more carotenoids in a water-immiscible organic solvent, and
 - a₃) mixing the solution obtained in a₁) or in a₂) with the aqueous molecular or colloidal solution of the mixture of lactose and the at least one soybean protein, to obtain a hydrophobic phase of the carotenoid in nanodispersed form.
18. (previously presented) The dry powder defined in claim 17 wherein stage a) of the process comprises
- a₁) dissolving the one or more carotenoids in a water-miscible organic solvent or in a mixture of water and a water-miscible organic solvent at a temperature above 30°C, and
 - a₃) mixing the solution obtained in a₁) with the aqueous molecular or colloidal solution of the mixture of lactose and the at least one soybean protein, to obtain a hydrophobic phase of the carotenoid in nanodispersed form.
19. (previously presented) The dry powder defined in claim 18 wherein the solution obtained in a₁) is mixed with the solution of the

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mixture of lactose and the soybean protein at a mixing temperature of from about 35°C to 80°C.

20. (previously presented) A human food, a pharmaceutical or an animal feed comprising the dry powder defined in claim 16.
21. (new) A method of improving the apparent density and color stability of a dry powder of one or more carotenoids which comprises
 - a) dispersing the one or more carotenoids in an aqueous molecular or colloidal solution of a mixture comprising effective amounts of lactose and a protective colloid, and optionally containing additional solvents, and
 - b) converting the dispersion formed in step a) into a dry powder by removing the water and the additional solvents and drying, optionally in the presence of a coating material,wherein at least one soybean protein is used as protective colloid in process step a).